UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,356	02/08/2002	Rene Helbing	10010648-1	2798

7590 04/06/2004

AGILENT TECHNOLOGIES, INC.
Legal Department, DL429
Intellectual Property Administration
P.O. Box 7599
Loveland, CO 80537-0599

EXAMINER	
CURTIS, CRAIG	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/071,356	HELBING, RENE
	Examiner	Art Unit
	Craig Curtis	2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *07 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-20,22-28 and 30-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-20,22-28 and 30-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Disposition of the Instant Application

- This Office Action is responsive to Applicant's Amendment filed on 7 January 2004.
- By this amendment, Applicant has canceled claims 1, 21, and 29, and has amended claims 2, 7, 9, 10, and 30.
- Claims 2-20, 22-28, and 30-33 are presently pending in the instant application.

Claim Rejections - 35 USC 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 2-4, 6, 7, 9-20, and 30-32 are rejected under 35 U.S.C. 102(b) as being unpatentable over Pan (6,181,846) in view of Nishikawa et al. (JP2000056399 A).

With regard to claim 2, Pan discloses the invention as claimed, an optical device comprising, inter alia, a polarization-controlling reflector (elements 18 & 19 in Figs. 3B & 3C: also see col. 2, ll. 65-67--col. 3, ll. 1-26, as well as col. 4, ll. 38-67--col. 5, ll. 1-23), said reflector having a plurality of states (i.e., On and Off); a polarization dependent optical-path device (15), said polarization-dependent optical-path device converting input-light polarization components that are at least

partially spatially-coincident and that have been coupled into the optical device into spatially-separated input-light polarization components, and wherein when said reflector is in a first one of said plurality of states, said orientation is such that said polarization-dependent optical-path device causes at least a portion of the reflected-light polarization components to be out-coupled from the optical device (see Figs. 3B & 3C)— **EXCEPT FOR** a teaching wherein said optical device further comprises a polarization-controlling reflector, said reflector converting incident-light polarization components having incident angles of polarization into reflected-light polarization components having reflected angles of polarization, said reflector having a plurality of states, and being controllable such that said reflector can be changed from one of said plurality of states to another of said plurality of states, said reflected angles of polarization having an orientation relative to said incident angles of polarization, said orientation being a function of the state of the reflector; and a polarization-dependent optical-path device, said polarization-dependent optical-path device converting input-light polarization components that are at least partially spatially coincident and that have been couple into the optical device into spatially separated input-light polarization components, said polarization-dependent optical-path device converting said spatially separated input-light polarization components into said spatially separated incident-light polarization components, and wherein when said reflector is in a first one of said plurality of states, said orientation is such that said polarization-dependent optical-path device causes at least a portion of the reflected-light polarization components to be out-coupled from the optical device.

Nishikawa et al., however, explicitly disclose a polarization-controlling reflector (see Figs. 1-3, 4(a), & 4(b), said reflector converting incident-light polarization components having incident angles of polarization into reflected-light polarization components having reflected angles of polarization, said reflector having a plurality of states, and being controllable such that said reflector can be changed from one of said plurality of states to another of said plurality of states, said reflected angles of polarization having an orientation relative to said incident angles of polarization, said orientation being a function of the state of the reflector; and a polarization-dependent optical-path device, said polarization-dependent optical-path device converting input-light polarization components that are at least partially spatially coincident and that have been couple into the optical device into spatially separated input-light polarization components, said polarization-dependent optical-path device converting said spatially separated input-light polarization components into said spatially separated incident-light polarization components, and wherein when said reflector is in a first one of said plurality of states, said orientation is such that said polarization-dependent optical-path device causes at least a portion of the reflected-light polarization components to be out-coupled from the optical device. Id. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of Pan such that it further comprise said polarization-controlling reflector explicitly taught by Nishikawa et al., for at least the purpose of controlling the polarization state of light traversing said optical device.

With regard to claim 3, the optical device taught by the combination further comprises an output polarization-dependent path splitting element (i.e., 16: see Figs. 3B & 3C), said ouput polarization-dependent path splitting element converting said spatially-separated reflected light components having reflected angles of polarization into spatially-separated reflected-light components having output angle of polarization, thereby defining a branched output (see dashed and solid lines of output light depicted in Figs. 3B & 3C), said output angles of polarization depending on the state of the reflector, wherein when said reflector is in said first one of said plurality of states, at least a portion of said output-light polarization components is out-coupled from said output-light polarization components that is out-coupled from the optical device through said branched output depends of the state of said reflector. See Figs. 3B & 3C; also see col. 4, ll. 38-50.

With regard to claims 4 & 11, the combination discloses, in Figs. 3B & 3C, the claimed invention as set forth above **EXCEPT FOR** an explicit teaching with respect to claim 4, wherein at least a portion of said output-light polarization components is out-coupled from the optical device through said branched input; and an explicit teaching with respect to claim 11, wherein said polarization-dependent optical-path device has at least a second input port and a second output port [in addition, of course, to the disclosed first input port (10) and the first output port (11)]. Pan, however, with respect to claim 4, additionally discloses an embodiment (depicted in Fig. 7) in which, after optical fibers 50-53 have been respectively denominated, one with respect to the others or pairwise, as being branched input or output, at least a portion of said output-light polarization

components is out-coupled from the optical device through said branched input. See col. 6, ll. 45-58; and with respect to claim 11, Pan explicitly teaches a second input port and a second output port (it being noted as being arbitrary which of ports 50-53 are to be so designated). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the optical device of Pan depicted in Figs. 3B & 3C therein such that at least a portion of said output-light polarization components be out-coupled from the optical device through said branched input, as well as such that said optical device further comprise a second input port and a second output port , both being taught by Pan in the embodiment of said optical device depicted in Fig. 7 therein, for at least the purposes of increasing the functionality of said optical device by allowing said output-light polarization components to be out-coupled from said optical device through more than one optical fiber, as well as allowing more than one set of input-light polarization components to be in-coupled to said device.

With regard to claim 6, as can be seen in Figs. 3B & 3C of Pan, said polarization-dependent combiner element (one and the same with element 15) converts said spatially-separated reflected-light polarization components having output angles of polarization into said output-light polarization components that are at least partially spatially coincident. See Figs. 3B & 3C.

With regard to claim 7, said polarization-dependent combiner (15) of Pan converts said spatially-separated reflected-light polarization components having a output angles [*read:* having

output angles] of polarization into output-light polarization components that are orthogonal to each other. See Figs. 3B & 3C.

With regard to claim 9, see overlap of optical path taken by input-light polarization components coupled into said optical device and the reflected-light polarization components out-coupled from said optical device, said overlap being deemed to meet Applicant's recitation of the "...at least partially share a common optical path within the optical device." limitation.

With regard to claim 10, please not the distinct of the input and output optical paths in the optical device of Pan, as depicted in Figs. 3B & 3C.

With regard to claims 12-20 & 32, it is submitted that--once account is taken of the various permutations of operation (express or implied) of the embodiment of the optical device depicted in Fig. 7 of Pan--the disclosures of Pan encompass the limitations recited in each of these claims.

With regard to claims 28-31, the structural teachings of Pan set forth hereinbefore implicitly meet the method step limitations recited in these claims. See above and Figs. 3B & 3C.

2. Claims 5, 8, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (5,973,831) in view of Nishikawa et al. (JP2000056399 A), as set forth above, and further in view of Gahan (4,799,768).

Pan discloses (in Fig. 7) the optical device as set forth above **EXCEPT FOR** wherein, with respect to claims 5 & 33, said plurality of states constitutes a continuum of states such that said optical device functions as an analog optical device, and wherein the respective portions of output-

light polarization components that are out-coupled from the optical device through said branched input and through said branched output is controllably variable over a continuum of said portions by selecting the state of the reflector from said continuum of states; and wherein, with respect to claim 8, when said reflector is in a third one of said plurality of states, the optical device functions as a beam splitter.

Gahan, however, provides an explicit teaching a reflector (18) having a plurality of states, said plurality of states constituting, inter alia, a continuum of states (col. 3, ll. 11-13). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reflector of Pan, already taught therein as having a plurality (*read:* two or more) of states, such that said plurality of states constitute a continuum of states, thereby functioning as an analog device (inherent), as explicitly taught by Gahan, for at least the purpose of enabling said optical device to output said output-light polarization components in a more variable manner than would be the case if said plurality of states of said reflector were limited to □on□ and □off□ states. And with respect to claim 8, it is submitted that in one of said plurality of states of said reflector in the combination that said optical device depicted in Fig. 7 of Pan would function as a beam splitter in the manner as that set forth in this claim.

3. Claims 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (5,930,422) in view of Pan (5,973,831) and Nishikawa et al. (JP2000056399 A).

With regard to claim 22, Cheng discloses the invention as claimed--[a]n integrated optical device (see Fig. 4) comprising:

at least a first input port (P1 or P2);

at least a first output port (P2 or P3);

a substantially non-reciprocal direction stage (14 & 16) comprising one or more elements , the directional stage receiving light from at least the first input port (see Fig. 4), the received light having polarization components (see polarization components walked-off by walk-off crystal 16), the directional stage controlling a path of propagation of the received light through the directional stage by operating on the polarization components of the received light (see above & Fig. 4);

a reflective element (20); and

a polarization stage (18) interposed between the directional stage and the reflective element, the polarization stage directing the polarization components of light propagating through the directional stage onto the reflective element by operating on the polarization components of the light received by the polarization from the directional stage (the operation being focusing in this instance)--**EXCEPT FOR** disclosure of the following additionally recited limitations: wherein said reflective element has a plurality of states such that light impinging on the reflective element is reflected by the reflective element with a polarization that depends on the state of the reflective element, and wherein

said polarization stage directs light components reflected from the reflective element into the directional stage with a polarization that depends on the state of the reflective element to enable the directional stage to control the path of propagation of the reflected light based on the polarization of the reflected light components (it being noted that modifying the optical device of Cheng such that its reflective element have a plurality of states such that light impinging on the reflective element is reflected by the reflective element with a polarization that depends on the state of the reflective element would necessarily, in light of the arrangement of the elements comprising the optical device of Cheng, enable said directional stage to control the path of propagation of the reflected light based on the polarization of the reflected light components).

Pan, however, provides an explicit teaching of a reflective element (18 & 19 in Figs. 3B & 3C) that has a plurality of states such that light impinging on the reflective element is reflected by the reflective element with a polarization that depends on the state of the reflective element (col. 3, ll. 11-26). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the optical device of Cheng such that its reflective element have a plurality of states such that light impinging on the reflective element be reflected by the reflective element with a polarization that depends on the state of the reflective element, as taught by Pan, for at least the purpose of providing increased directional control of said polarization components of light propagating through said optical device. Please see above with regard to the teachings of Nishikawa et al.

With regard to claims 23-25, once account is taken of the fact that both a first one and a second one of said plurality of states of said reflective element can be a non-off state, the optical device of combination meets the limitations recited in these claims. See above and Fig. 4 of Cheng (the designation of ports as being first input, second input, etc., being arbitrary).

With regard to claim 26, directional stage of the combination comprises a walk-off crystal (16) and a Faraday rotator (14). See 14 & 16 in Cheng.

With regard to claim 27, said polarization stage of the combination comprises a birefringent element (18).

With regard to claim 28, said reflective element of the combination comprises a liquid crystal cell. See 18 in Pan; also see col. 5, ll. 8.

Response to Arguments

4. Applicants arguments with respect to the claims filed on 7 January 2004 have been fully considered but have been rendered moot in view of the new grounds of rejection. Applicant's attorney is respectfully requested to contact the Examiner, prior to responding formally to this Office Action, for the purpose of expediting the prosecution of the instant application.

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Curtis, whose telephone number is (571) 272-2311.

Any inquiry of a general nature regarding the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.

C.H.C.

Craig H. Curtis
Group Art Unit 2872
2 April 2004

Audrey Chang
Primary Examiner
Technology Center 2800